

CLAIMS:

1. A method comprising:
establishing a label switched path (LSP) through one or more intermediate networks communicatively coupled between a first customer network and a second customer network;
communicating layer two (L2) service information using a first routing protocol between a first device associated with the first customer network and a second device associated with the second customer network; and
providing an L2 service in accordance with the L2 service information to transport L2 communications between the first customer network and the second customer network through the one or more intermediate networks using the LSP.
2. The method of claim 1, wherein establishing an LSP comprises exchanging label information associated with the LSP between the one or more intermediate networks using a second routing protocol.
3. The method of claim 2, wherein the second routing protocol carries the label information in association with routes advertised between the intermediate networks.
4. The method of claim 2, wherein the second routing protocol carries the label information as network layer reachability information (NLRI) that is associated with a route advertised between the first customer network and the second customer network.
5. The method of claim 2, wherein the second routing protocol comprises the Border Gateway Protocol (BGP).
6. The method of claim 2, wherein the label information conforms to one of Multi-protocol Label Switching (MPLS) or the Label Distribution Protocol (LDP).
7. The method of claim 2, wherein the first routing protocol is the same as the second routing protocol.

8. The method of claim 1, communicating L2 service information using a first routing protocol comprises communicating the L2 service information between the first device and the second device using an exterior routing protocol.
9. The method of claim 8,
 - wherein communicating L2 service information comprises communicating the L2 service information using an intermediate route relay device,
 - wherein the L2 service information includes information for L2 sites or end-points within the second customer network and next hop information used to reach these L2 sites or end-points from the first customer network, and
 - wherein the method includes configuring the intermediate route relay device to maintain and relay the next hop information unchanged via the exterior routing protocol.
10. The method of claim 1, wherein the L2 service comprises the Virtual Private LAN Service and the L2 communications comprise Ethernet communications.
11. The method of claim 1, wherein providing an L2 service comprises:
 - receiving L2 communications from the first customer network; and
 - assigning labels to the L2 communications from the first customer network in accordance with the label information to form packets for transporting the L2 communications from the first customer network to the second customer network.
12. A device comprising:
 - a routing process that receives label information for a label switched path (LSP) through one or more intermediate networks communicatively coupled between a first customer network and a second customer network; and
 - a layer two (L2) service that receives L2 service information associated with the second customer network using a first routing protocol, and transports L2 communications between the first customer network and the second customer network through the one or more intermediate networks in accordance with the label information.

13. The device of claim 12, wherein the routing process receives the label information through the one or more intermediate networks via a second routing protocol.

14. The device of claim 13, wherein the second routing protocol carries the label information in association with routes advertised between the one or more intermediate networks.

15. The device of claim 13, wherein the second routing protocol carries the label information as network layer reachability information (NLRI) that is associated with a route advertised between the first customer network and the second customer network.

16. The device of claim 13, wherein the second routing protocol comprises the Border Gateway Protocol (BGP).

17. The method of claim 13, wherein the first routing protocol is the same as the second routing protocol.

18. The device of claim 12, wherein the label information conforms to one of Multi-protocol Label Switching (MPLS) or the Label Distribution Protocol (LDP).

19. The device of claim 12, wherein the device receives the L2 service information from a second device associated with the second customer network via an exterior routing protocol.

20. The device of claim 19,
wherein the L2 service information includes information for L2 sites or end-points in the second customer network and next hop information used by the device to reach these remote L2 sites or end-points, and
wherein the device is configured relay the next hop information unchanged using the exterior routing protocol when the device receives the L2 service information and the next hop information via an intermediate route relay device.
21. The device of claim 12, wherein the L2 service comprises the Virtual Private LAN service (VPLS) and the L2 communication comprise Ethernet communications.
22. The device of claim 12, wherein the L2 service receives L2 communications from the first customer network, and assigns labels to the L2 communications from the first customer network in accordance with the label information to form packets for transporting the L2 communications from the first customer network to the second customer network through the one or more intermediate networks via the LSP.
23. The device of claim 12, wherein the device comprises a provider edge router or a customer edge router.

24. A system comprising:
- a border router that establishes a label switched path (LSP) through one or more intermediate networks, wherein the LSP communicatively couples a first customer network and a second customer network;
 - a first route reflector associated with the first customer network that communicates layer two (L2) service information with a second route reflector associated with the second customer network; and
 - an edge router that provides an L2 service to the first customer network in accordance with the L2 service information to transport L2 communications between the first customer network and the second customer network through the one or more intermediate networks using the LSP.
25. The system of claim 24, wherein the border router establishes the LSP by exchanging label information associated with the LSP between the one or more intermediate networks using a routing protocol.
26. The system of claim 25, wherein the routing protocol has been redefined to carry the label information in association with routes advertised between the intermediate networks.
27. The system of claim 25, wherein the routing protocol has been redefined to carry the label information as network layer reachability information (NLRI) that is associated with a route advertised between the first customer network and the second customer network.
28. The system of claim 25, wherein the routing protocol comprises the Border Gateway Protocol (BGP).
29. The system of claim 25, wherein the label information conforms to one of Multi-protocol Label Switching (MPLS) or the Label Distribution Protocol (LDP).

30. The system of claim 24, wherein the first route reflector communicates the L2 service information with the second route reflector via an exterior routing protocol.

31. The system of claim 30,
wherein the L2 service information specifies one or more L2 sites or end-points in the second customer network and includes next hop information used to reach these L2 sites or end-points from the first customer network, and

wherein the first and second route reflectors are configured to maintain and relay the next hop information unchanged upon receiving the next hop information via the exterior routing protocol.

32. The system of claim 24, wherein the edge router provides an L2 service that comprises the Virtual Private LAN Service to transport the L2 communications that comprise Ethernet communications.

33. The system of claim 24, wherein the edge router provides an L2 service by receiving L2 communications from the first customer network, and assigning labels to the L2 communications from the first customer network in accordance with the label information to form packets for transporting the L2 communications from the first customer network to the second customer network through the one or more intermediate networks via the LSP.

34. A computer-readable medium comprising instructions to cause a processor to:
execute a routing process that receives label information for a label switched path (LSP) through one or more intermediate networks communicatively coupled between a first customer network and a second customer network; and
execute a layer two (L2) service that receives L2 service information associated with the second customer network using a first routing protocol, and transports L2 communications between the first customer network and the second customer network through the one or more intermediate networks in accordance with the label information.

35. The computer-readable medium of claim 34,
wherein the routing process receives the label information through the one or more intermediate networks via a second routing protocol, and
wherein the second routing protocol carries the label information in association with routes advertised between the one or more intermediate networks.
36. The computer-readable medium of claim 35, wherein the second routing protocol comprises the Border Gateway Protocol (BGP).
37. The computer-readable medium of claim 35, wherein the first routing protocol is the same as the second routing protocol.